IX SEMINÁRIO DE PREVENÇÃO E CONTROLE DE INFECÇÃO EM SERVIÇOS DE SAÚDE DE SANTA CATARINA

Resistência a antimicrobianos de cepas bacterianas isoladas de alimentos

Marília Miotto

Florianópolis
2017

Caracterização e quantificação de *Escherichia coli* de moluscos bivalves por PCR em Tempo Real

Genotypic and phenotypic characterization of *Escherichia coli* Isolated from mollusks in Brazil and United States

UFSC

UNIVERSITY of MARYLAND EASTERN SHORE

O estado de Santa Catarina é o maior produtor nacional de pescados, sendo destaque tanto na área da aquicultura quanto da pesca. O **cultivo de moluscos bivalves** merece destaque no litoral de Santa Catarina e, desde 1991, a produção vem crescendo e se tornando uma importante **atividade econômica.**

Santa Catarina:

→ Maior produtor de ostras e mexilhões do Brasil;
→ Segundo maior da América Latina;
→ Movimentação financeira bruta estimada em R$ 78.000.000,00 – 2015.
→ 572 maricultores
→ 12 municípios
→ MAPA – NMP/100g de *E. coli*

(SANTOS; COSTA, 2016; BRASIL, 2017).

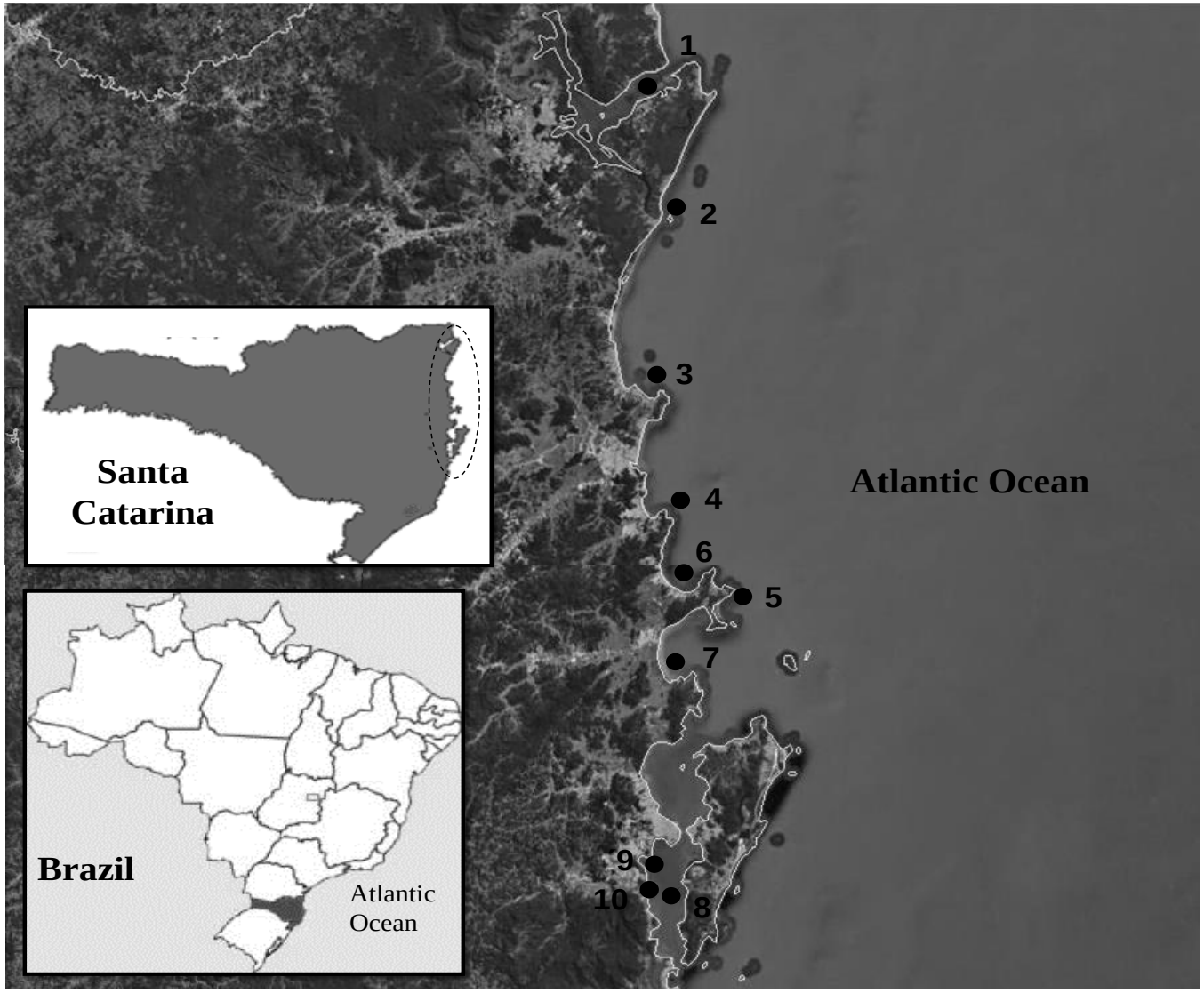
Ostra (*Crassostrea gigas*)

Mexilhão (*Perna perna*)

Coleta das amostras

Brasil: Janeiro - Julho/2015
40 amostras: *Crassostrea gigas* e *Crassostrea rhizophorae*
60 amostras: *Perna perna*

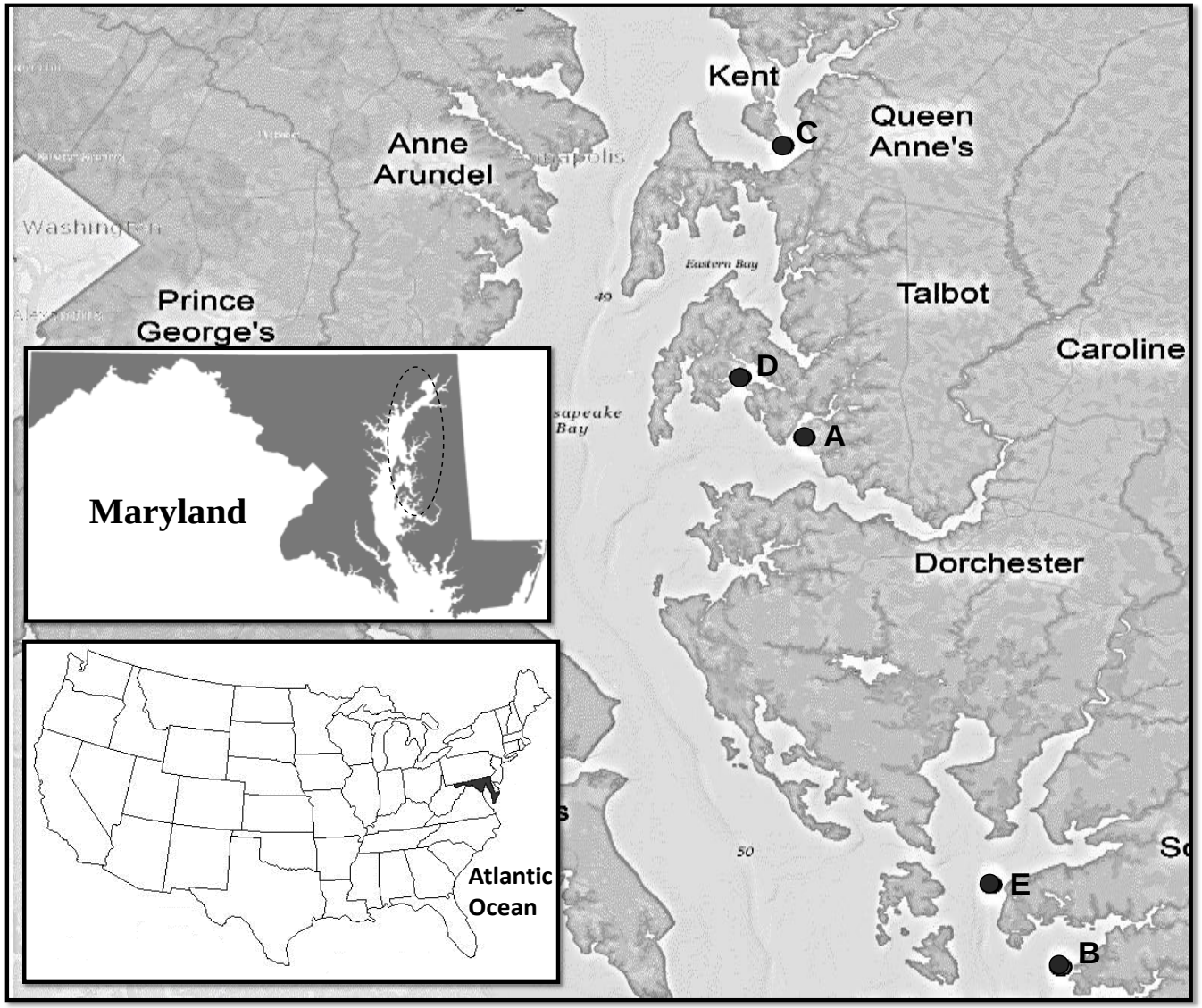
Site 1: São Francisco do Sul;
Site 2: Balneário Barra do Sul;
Site 3: Penha;
Site 4: Balneário Camboriú;
Site 5: Bombinhas;
Site 6: Porto Belo;
Site 7: Gov. Celso Ramos;
Site 8: Florianópolis;
Site 9: São José;
Site 10: Palhoça.



Coleta das amostras

EUA: Outubro-Novembro/2015
18 amostras: *Crassostrea virginica*

Site A: Oxford;
Site B: Manokin;
Site C: Chester;
Site D: Broad Creek;
Site E: Tangier Sound



2.3 Análises microbiológicas

Método ISO 16649-3 (ISO, 2005);
NMP/100g

(ISO, 2005).

Teste de susceptibilidade a antimicrobianos

Método de disco difusão

Clinical and Laboratory Standards Institute (CLSI)

Antimicrobianos utilizados:

amicacina (AN, 30 µg); amoxicillina/ácido clavulanico (AMC, 20/10 µg); ampicillina (AM, 10 µg); cefepime (FEP, 30 µg); cefoxitina (FOX, 30 µg); ceftriaxona (CRO, 30 µg); cefalotina (KF, 30 µg); chloranfenicol (C, 30 µg); ciprofloxacino (CIP, 5 µg); gentamicina (GM, 10 µg); ácido nalidixico (NA, 30 µg); nitrofurantoina (FM, 300 µg); norfloxacino (NOR, 10 µg); tetraciclina (TE, 30 µg); trimetropina/sulfametoxazol (SXT, 1.25/23.75 µg).

(CLSI, 2012).

Teste de susceptibilidade a antimicrobianos

Sensível, Intermediário e Resistente: CLSI

Multirresistente (MDR): resistente a três ou mais classes de antimicrobianos

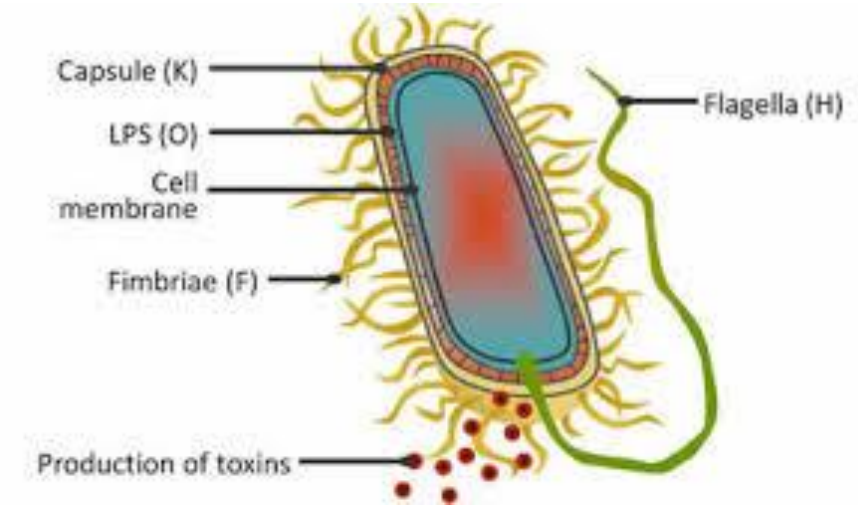
(PAGADALA et al., 2012; CLSI, 2014; SCHWARZ et al., 2010; PARVEEN et al., 1999).

Determinação dos sorogrupos

Metodologia descrita por Orskov et al., 1997;

Antisoros para os sorogrupos O1-O187 (181 antisoros);

E. coli Reference Center, Pennsylvania State University, Pennsylvania, USA.

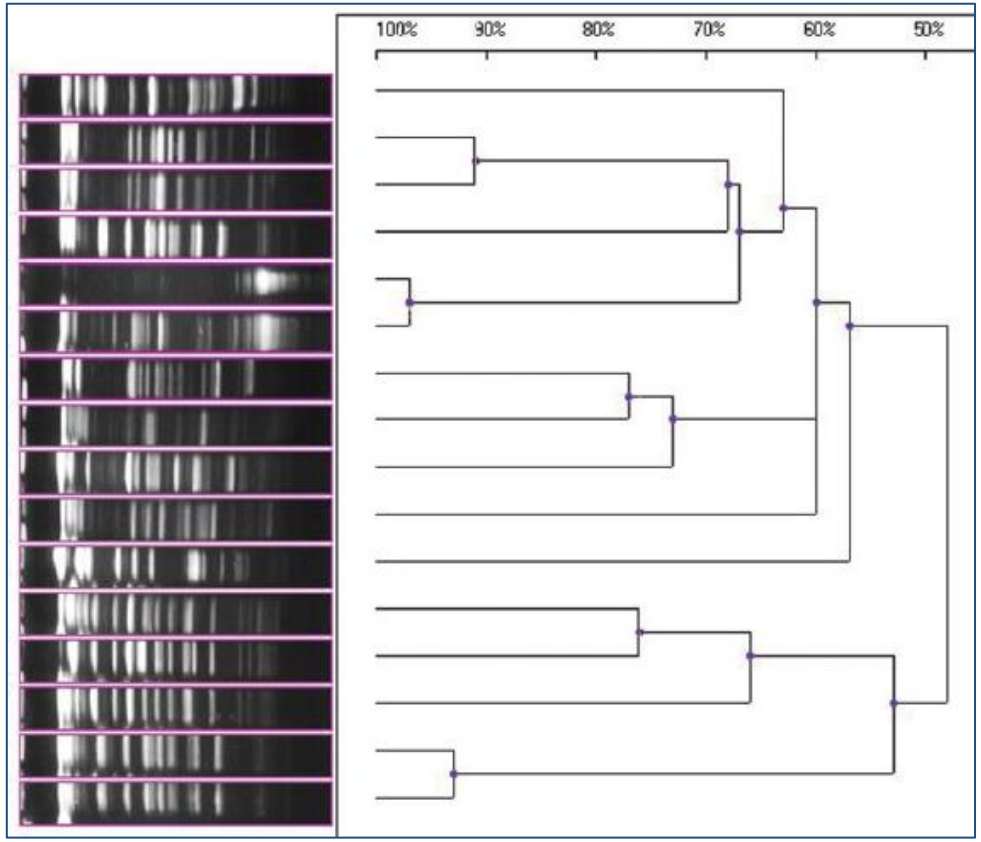


(ORSKOV et al., 1977).

Tipagem Molecular

Bionumerics software (AppliedMaths, Austin, TX, USA);

Os perfis de PFGE foram estabelecidos com base no número e na disposição dos fragmentos e no nível de relação utilizando o coeficiente de similaridade de Dice e médias aritméticas não ponderadas (UPGMA) e coeficiente de correlação de Pearson (0,5%).



80% de similaridade

geneticamente relacionadas.

100% de similaridade

clones

(BALIERE et al., 2015b; CHUNG et al., 2012; KAO et al., 2016; RABBIA et al., 2016).

Resultados

Prevalência e contagem de *E. coli*

Brasil: 100 %
20 a 18.000 NMP/100g
49% ≤ 230 NMP/100g

EUA: 61 %
20 a 130 NMP/100g

Brasil: 1 isolado de cada amostra positiva

EUA: 3 a 5 isolados de cada amostra positiva

} **141 cepas**

Teste de susceptibilidade a antimicrobianos

Susceptíveis:

Cefepima (99,3 %)
Norfloxacino (97,2 %)
Cloramfenicol (95,7 %)
Trimetoprima/sulfametoxazol (91,5 %).

Resistentes:

82 % → resistente a pelo menos 1 antimicrobiano

MDR:

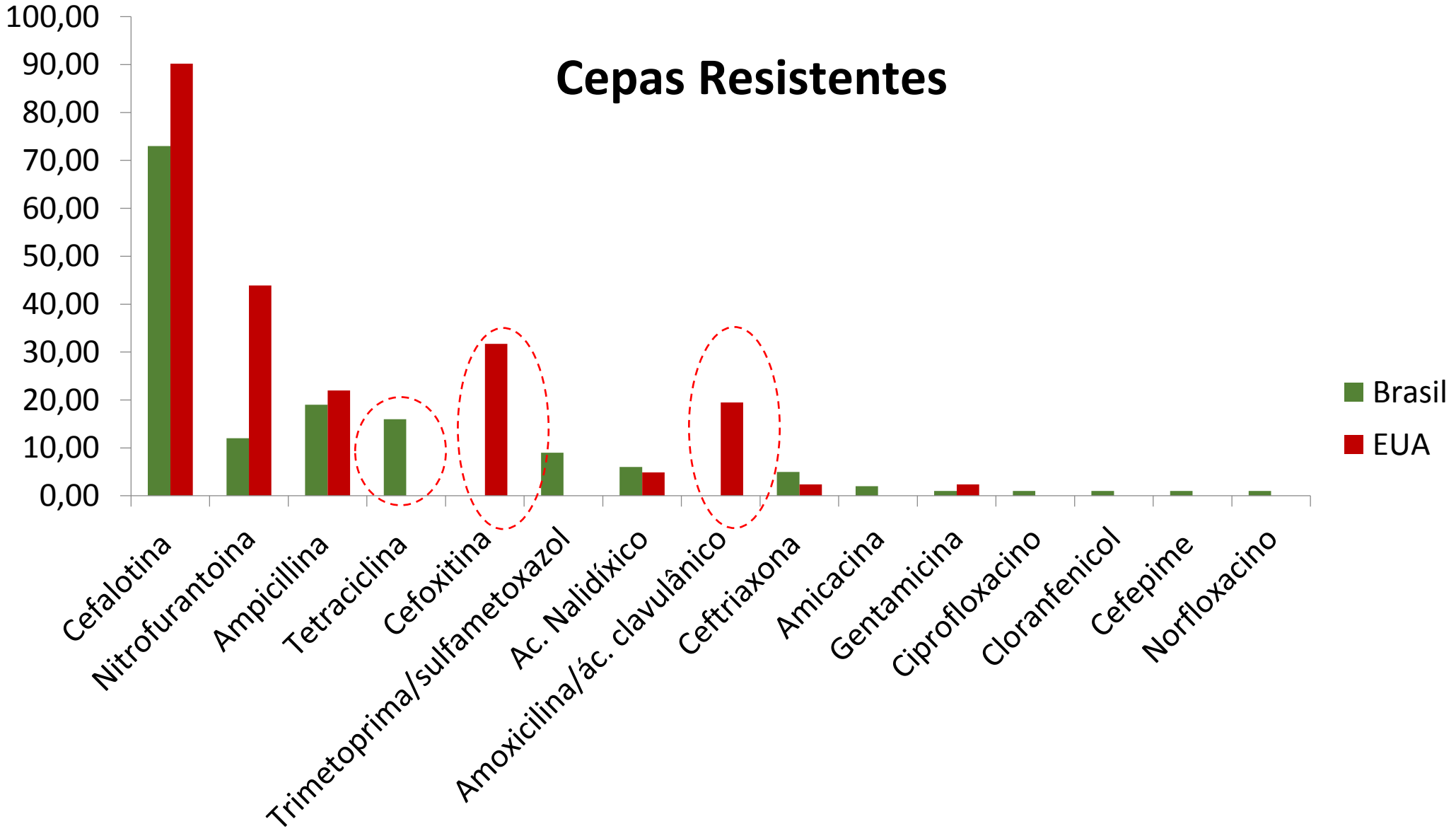
19,9 % → Total
26,8 % → USA
17 % → Brasil

Teste de susceptibilidade a antimicrobianos

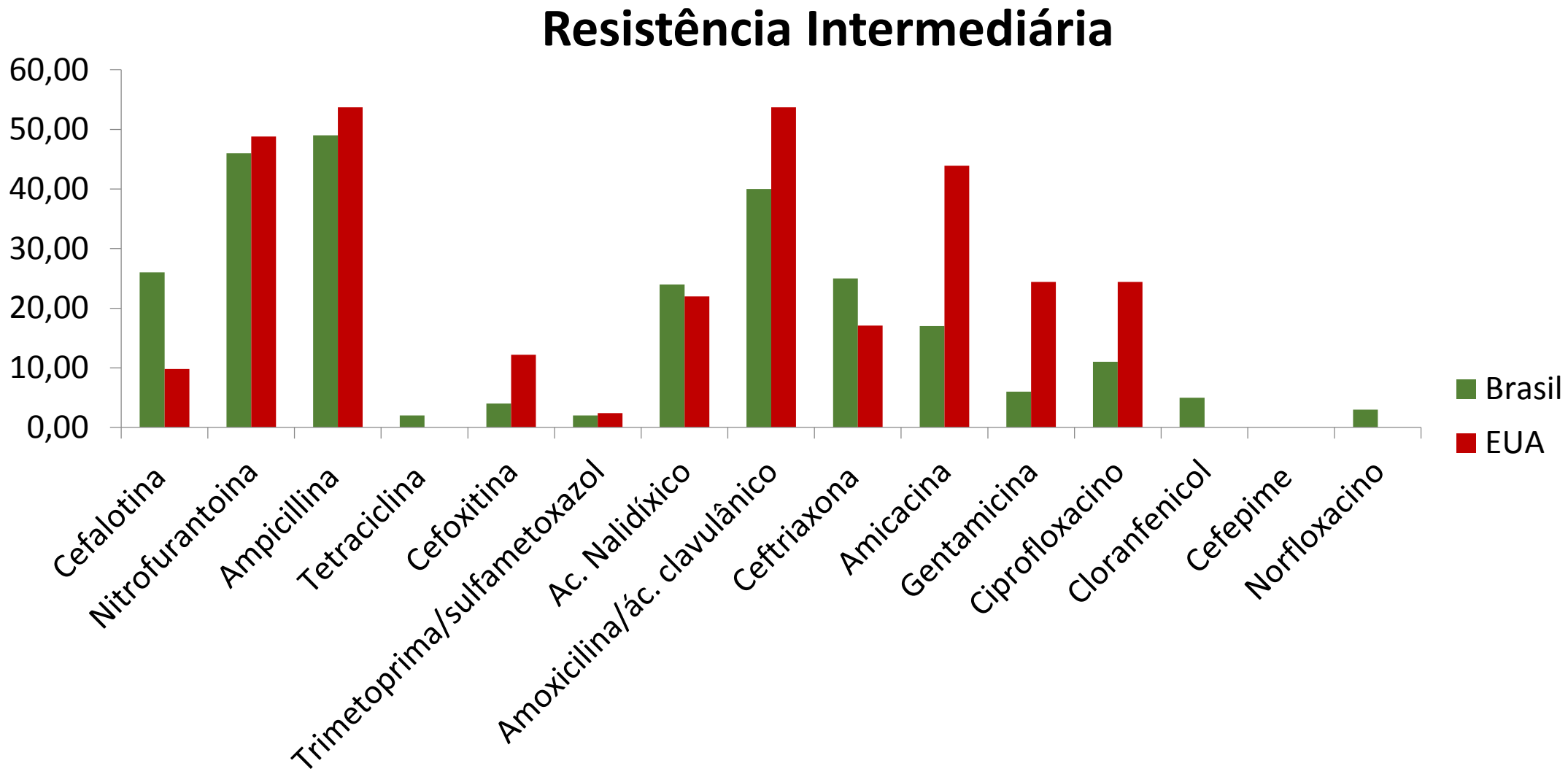
Tabela 1 – Porcentagens de isolados resistentes e com resistência intermediária aos antimicrobianos testados.

Antimicrobiano	Brasil (n = 100)		EUA (n = 41)		Total (n = 141)	
	Resistente	Intermediário	**Resistente**	Intermediário	**Resistente**	Intermediário
Cefalotina	**73**	26	**90.2**	9.8	**78**	22
Nitrofurantoina	**12**	46	**43.9**	48.8	**21.3**	46.8
Ampicillina	**19**	49	**22**	53.7	**19.2**	50.4
Tetraciclina	**16**	2	**0**	0	**11.4**	1.4
Cefoxitina	**0**	4	**31.7**	12.2	**9.2**	6.4
Trimetoprima/sulfametoxazol	**9**	2	**0**	2.4	**6.4**	2.1
Ac. nalidíxico	**6**	24	**4.9**	22	**5.7**	6
Amoxicilina/ác. clavulânico	**0**	40	**19.5**	53.7	**5.7**	44
Ceftriaxona	**5**	25	**2.4**	17.1	**4.3**	22.7
Amicacina	**2**	17	**0**	43.9	**1.4**	24.8
Gentamicina	**1**	6	**2.4**	24.4	**1.4**	11.3
Ciprofloxacino	**1**	11	**0**	24.4	**0.7**	14.9
Cloranfenicol	**1**	5	**0**	0	**0.7**	3.5
Cefepime	**1**	0	**0**	0	**0.7**	0
Norfloxacino	**1**	3	**0**	0	**0.7**	2.1

Teste de susceptibilidade a antimicrobianos



Teste de susceptibilidade a antimicrobianos



MDR

Site 1: São Francisco do Sul;
Site 2: Balneário Barra do Sul;
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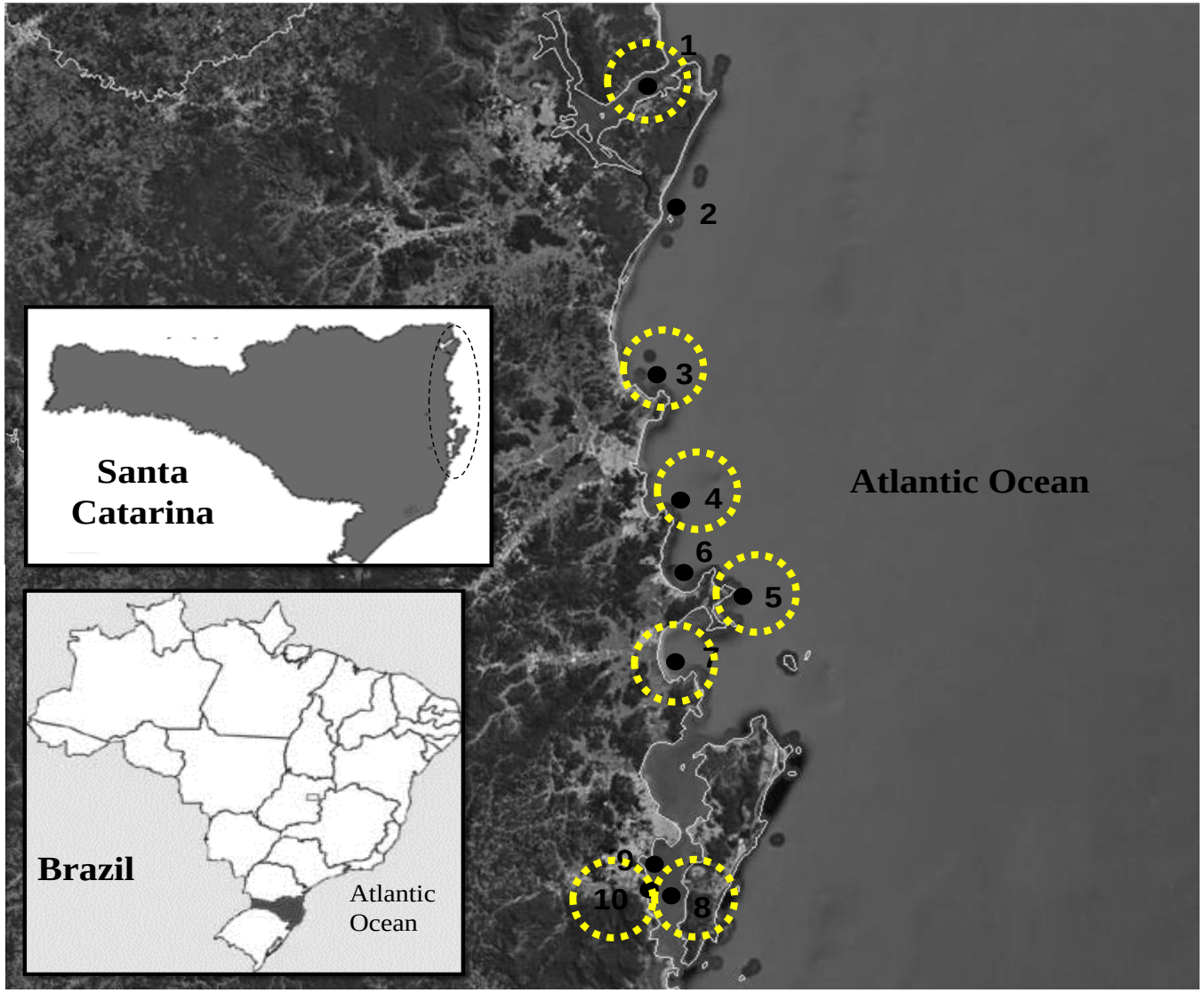

Determinação dos sorogrupos

O86, O126, O128 → Brasil → *E. coli* enteropatogênica (EPEC), WHO

O6, O7, O8 → *E. coli* enterotoxigênica (ETEC)→ Prontos para consumo na China

O15 → Brasil → *E. coli* enteropatogênica (EPEC) → mexilhão na França, Brasil.

O5, O146 → Brasil

O113, O88 → Brasil e USA

} EPEC *E. coli* → moluscos na França

(ZHANG et al., 2016; BALIÉRE et al., 2015, REGUA-MANGIA et al., 2009; WHO, 1987).

APPLIED AND ENVIRONMENTAL MICROBIOLOGY, July 1997, p. 2607–2612 Vol. 63, No. 7
0099-2240/97/$04.00+0

Association of Multiple-Antibiotic-Resistance Profiles with Point and Nonpoint Sources of *Escherichia coli* in Apalachicola Bay†

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Received 24 February 1997/Accepted 22 April 1997

A total of 765 *Escherichia coli* isolates from point and nonpoint sources were collected from the Apalachicola National Estuarine Research Reserve, and their multiple-antibiotic-resistance (MAR) profiles were determined with 10 antibiotics. *E. coli* isolates from point sources showed significantly greater resistance ($P < 0.05$) to antibiotics and higher MAR indices than isolates from nonpoint sources. Specifically, 65 different resistance patterns were observed among point source isolates, compared to 32 among nonpoint source isolates. Examples of this contrast in MAR profiles included percentages of isolates with resistance to chlortetracycline-sulfathiazole of 33.7% and to chlortetracycline-penicillin G-sulfathiazole of 14.5% for point source isolates versus 15.4 and 1.7%, respectively, for nonpoint source isolates. MAR profile homology, based on coefficient similarity, showed that isolates from point sources were markedly more diverse than isolates from nonpoint sources. Seven clusters were observed among point source isolates, with a coefficient value of approximately 1.8. In contrast, only four clusters were observed among nonpoint source isolates. Covariance matrices of data displayed six very distinct foci representing nonpoint source *E. coli* isolates. Importantly, *E. coli* isolates obtained directly from human and animal feces also clustered among point and nonpoint sources, respectively

PRACTICE INSIGHTS

Agricultural Applications for Antimicrobials. A Danger to Human Health: An Official Position Statement of the Society of Infectious Diseases Pharmacists

Samuel L. Aitken,[1] Thomas J. Dilworth,[2] Emily L. Heil,[3] and Michael D. Nailor,[4,5,*]
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The use of antibiotics in agriculture, particularly in food-producing animals, is pervasive and rep
otic use worldwide. The link between antibiotic use
ns is unequivocal. Transmission can occur by ingesti
eria, by direct contact of animals by animal handlers, a
aquaculture and antifungals used in horticulture are a
ions aimed at decreasing the amount of antibiotics used
of antibiotic resistance have recently been implemente
ize antibiotic use in agriculture. This article describes t

O *link* entre o uso de antibioticos em animais e a resistencia é evidente. A transmissão pode ocorrer através da ingestão de alimentos crus que contenham bactérias resistentes, pelo contato direto com animais…. (Aitken, 2016);

APPLIED AND ENVIRONMENTAL MICROBIOLOGY, Oct. 2011, p. 7134–7141 Vol. 77, No. 20
0099-2240/11/$12.00 doi:10.1128/AEM.05087-11

Acquired Antibiotic Resistance: Are We Born with It?▽

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Received 11 April 2011/Accepted 10 July 2011

The rapid emergence of antibiotic resistance (AR) is a major public health concern. prevalence of food-borne antibiotic-resistant (ART) commensal bacteria in ready-to-c suggested that daily food consumption likely serves as a major avenue for disseminatio the food chain to human hosts. To properly assess the impact of various factors, inclu AR development in hosts, it is important to determine the baseline of ART bacteria i testinal (GI) tract. We thus examined the gut microbiota of 16 infant subjects, from the of age, who fed on breast milk and/or infant formula during the early stages of develop exposure to antibiotics. Predominant bacterial populations resistant to several antibio tance genes were found in the infant GI tracts within the first week of age. Several ART were also observed in the absence of antibiotic exposure and dietary changes. Repres including *tet*(M), *ermB*, *sul2*, and bla_{TEM} were detected in infant subjects. *Enterococcus* sp *Klebsiella* spp., *Streptococcus* spp., and *Escherichia coli*/*Shigella* spp. were among the iden ART bacteria were not detected in the infant formula and infant foods examined, skin-associated ART bacteria were found in certain breast milk samples. The data development of AR in the human gut microbiota is independent of infants' exposure to impacted by exposure to maternal and environmental microbes during and after deli population is significantly amplified within the host even in the absence of antibiotic

The rapid emergence of antibiotic-resistant (ART) pathogens has been a critical public health concern with major social impacts. It is estimated that nosocomial infections are respon- viously realized, suggesting tha gens, simply lifting the antibio be enough for effective mitig

Após a ingestão de alimentos, a aquisição ou disseminação de genes de resistencia pode ser possível através de interações com a microflora do intestino (Allen et al., 2016);

LWT - Food Science and Technology 86 (2017) 201–208

Contents lists available at ScienceDirect

LWT - Food Science and Technology

journal homepage: www.elsevier.com/locate/lwt

Antimicrobial resistance of *Lactobacillus* spp. from fermented foods and human gut

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ARTICLE INFO

Article history:
Received 21 January 2017
Received in revised form
21 July 2017
Accepted 29 July 2017
Available online 1 August 2017

ABSTRACT

A total of 122 *Lactobacillus* strains were isolated from household-prepared or commercial yogurts and pickles in Sichuan, among which 15 representative strains, along with another 37 strains isolated from human guts, were analyzed for their antimicrobial resistance (AMR) to 17 clinically significant antimicrobials applied in China by agar dilution method. The correlation of AMRs in *Lactobacillus plantarum* from fermented foods and human gut was examined. The AMRs varied with *Lactobacillus* species. For *L. plantarum*, the distributions of minimum inhibitory concentration to 12 antimicrobials were correlated

Considerando que homens e animais de companinha dividem o mesmo ambiente, a transferência de bacterias resistentes ou determinantes de resistencia entre animais de companhia e o homem é possível e já documentado em alguns estudos (Simjee et al., 2002; Guardabassi et al., 2004).

→ Extenso uso de antibióticos

→ Compartilhamento dos genes de resistência entre as bactérias e entre os indivíduos

Muito obrigada!!

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